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Insect and Disease Input to the Pioneer Hazard Reduction Project, Lake Tahoe Basin Management Unit

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Background

The proposed Pioneer Hazard Reduction Project is one of several vegetation management projects initiated by the Lake Tahoe Basin Management Unit (LTBMU) over the past few years designed to improve the health of the Basin's forests and reduce the potential for catastrophic wildfire. Surveys show that increasing Jeffrey and lodgepole pine mortality has been occurring in parts of the 3,000 acre Pioneer project area since 1993-94. Mortality groups consisting of current and 2 to 3 years of older dead trees, are scattered throughout the proposed sale units. Project stand exam data shows that infested portions of the proposed sale units vary from 2% to 17% by area with the units ranging from 19 acres to 450 acres. This mortality is largely a result of interactions between stand conditions (overstocking) and increasing activity by the Jeffrey pine beetle (JPB), Dendroctonus jeffreyi (Coleoptera: Scolytidae) in Jeffrey pine and the mountain pine beetle (MPB), D. ponderosae, in lodgepole pine. Both lodgepole pine dwarf mistletoe (Arceuthobium americanum) and western dwarf mistletoe (A. campylopodum) on Jeffrey pine are also present in the project area.

Discussion

The following insect and disease related comments address issues raised during field visits to the Pioneer Project area in September, 1996, and are intended for consideration in developing and evaluating alternatives for the Project.

(1) It was sugggested that a "Bark Beetle Suppression Only" alternative be considered. Observations of Jeffrey pine beetle-related mortality since the early 1980's in the Lake Tahoe Basin and in other areas that experienced Jeffrey pine mortality indicate that the timely removal of JPB-infested trees will help reduce/prevent subsequent mortality in the immediate area (Wenz et.al., in preparation). In the case of the Pioneer Project, this means

locating, marking, and removing (or destroying the brood in) currently infested JPB trees by June 1, 1997.

(A) Implementation of this alternative (or any alternative(s)) involving suppression of the 1996-1997 JPB generation) will require that sale and contract preparation and any needed improvement of the transportation system be completed within timeframes that would allow removal of the JPB infested trees (or brood destruction) by June 1, 1997. The scattered spatial distribution of the currently infested trees/ mortality groups may complicate timely removal.

(B) Effective implementation of this alternative will likely result in short-term (1 to 3 years) reduced mortality in the project area due to preventing and/or limiting enlargement of existing mortality groups and initiation of new mortality spots. This reduced mortality may be of particular significance from a fuels perspective in Defensible Fuel Profile Zones (DFPZ's), within 1/4 mile of urban/wildland interface areas. Implementation of this alternative would not alter the conditions (see #2, below) that tend to make trees/stands susceptible to bark beetle attack. Thus, after the initial period of reduced mortality, increasing, fluctuating, levels of mortality can be expected through time due to immigration of beetles from outside the treated areas.

(C) The efficacy of removing MPB- infested lodgepole pine has not been documented in terms of reducing/preventing subsequent lodgepole pine mortality.

(D) Implementation of the "Suppression Only" alternative by itself would require additional stand entries if other management actions are subsequently designated for implementation.

(2) In part because of bark beetle biology and host selection behavior, the condition/vigor of the host tree is an important influence on whether attacks will be successful. Vigorously growing, healthy, conifers are more likely to resist bark beetle attacks through evolved defense mechanisms. Trees weakened by moisture stress, fire, physical injury, disease or between-tree competition due to overstocking are more likely to be killed. Stands can be classified as imminently susceptible when conditions are such that they are very likely to experience significant change in structure or character as a result of insect-related mortality (and/or fire) in the near future.

Such mortality can result in stand openings that range from less than 1/4 acre to 5 acres or more and an increase in the amount of standing dead and down woody material. This can have consequences relative to (a) the need/ opportunity for salvage; (b) increased fuel loading; (c) increased wildlife habitat (snags/downed woody material); (d) increased nutrient cycling; and (e) depending on location, an increase in hazard trees. The effects of mortality may be particularly important in Defensible Fuel Profile Zones.

(A) Based on Pioneer Project stand exam data, the site index for the stands is a Meyer 70 to 80 and the current average stocking in terms of basal area is about 170 to 175 sq. ft./ acre which is approximately 86% to 92% of fully stocked levels (Meyer, 1938). Current Stand Density Indexes (SDI's) for the project units range from 205 to 406. Oliver (1995) has shown that bark beetles create a limiting SDI of 365 (where bark beetle mortality rules stand density) which differs little between stands located east and west of the Sierra Nevada

and Cascade Range crests. This study indicates that an SDI of 230 defines a threshold zone of imminent mortality above which bark beetle mortality begins to increase. Fourteen of the 16 stand exam units in the Pioneer Project exceed this 230 threshold. This suggests that most of the stands in the Pioneer Project are highly susceptible to continued bark beetle attack.

(B) Alternatives that include prescriptions for thinning stands to between 55% and 70% of full stocking will reduce stand susceptibility to bark beetle attack (Fiddler et al., 1989; CFPC, 1995). Efficacy will increase with increasing acres thinned. Alternatives that do not include thinning or only minimal amounts of thinning such as "No Action" and "Salvage Only", will not reduce stand susceptibility to bark beetle attack.

(C) The presence of dwarf mistletoe in Jeffrey and lodgepole pine in the project area is recognized. Thinning prescriptions will take into account dwarf mistletoe infections as one criteria for tree removal. Depending on the management actions implemented (or not implemented) under the Pioneer Hazard Reduction Project, the Basin might consider a subsequent evaluation to assess resulting dwarf mistletoe infection levels and any need for further management action.

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